

ductions. Air is supposed to be a frictionless fluid, and it needs some little care to distinguish between deductions from theory and experiment. With the assumptions clearly stated the chapters would be sound.

The applications of principles and tables to designs will be quite easily understood and appreciated, the calculations involving only the most elementary knowledge of algebra, and the guiding principles being quite trustworthy.

Laboratory apparatus does not make an impressive portion of the book, the notes given being of very general interest only, and in most cases insufficient to give any practical guidance to students new to experimental aerodynamics.

The remainder of the book is then occupied by descriptions of the successful flying machines and engines. As before, when the author was dealing with established data, the work is good, and as complete as is possible at the present time, the items of further interest being difficult to obtain.

The book is well worth reading by anyone starting on a study of aeronautics, as, in spite of its simple and elementary character, it is a fairly complete survey of the more trustworthy existing knowledge and practice.

(2) It is exceedingly difficult to appreciate the point of view of the author of this book. The mechanical principles involved are curiously contorted, and a brand new theory of lift is put forward which the author confesses may be defective. The theory is then justified by the remark that if modified as indicated "such a theory could not give any determinate data."

Many of the calculations are nevertheless right, and, in fact, are usually so on the assumptions adopted.

Passing over minor points, we find on p. 17 that velocity and acceleration have come to mean so much the same thing to the author, that the reader is told that if V be the vertical velocity of a weight W , which is moved by pushing an inclined plane under it, the vertical force on the plane when moving with constant forward velocity is greater than the force when the plane is at rest by $\frac{WV}{g}$. By sacrificing consistency, however, the author gets back to better dynamical principles when dealing with fluids.

In order to make the mass of fluid dealt with determinate, various arbitrary and improbable assumptions are made, and considering everything, the consequent numerical results are remarkably good. A wholesome respect for records of flights enables the author to extract multiplying factors to replace defects of theory.

On p. 23 is given an *a priori* proof that a "partial vacuum cannot be produced in the neighbourhood of an aeroplane in an open atmosphere. In view of experimental evidence that "partial" vacua are extremely important, an *a priori* proof is absolutely worthless. The argument is, however, consistent with a general attitude of doubt as to the value of experiments on models, the law of relative motion, and the

resources of scientific inquiry not being fully appreciated. (Pp. 62-3, &c.)

The very difficult problem of obtaining automatic stability is dismissed in five lines as a simple problem having many simple solutions.

To anyone beginning the serious study of flight this book would appear to be a dangerous introduction.

L. BAIRSTOW.

OUR BOOK SHELF.

School of Agriculture, Cambridge. A Course of Practical Work in Agricultural Chemistry for Senior Students. By Prof. T. B. Wood. Pp. 56. (Cambridge: University Press, 1911.) Price 2s. 6d. net.

IN this modest booklet Prof. Wood sets out the practical exercises through which his students are expected to work during their course in the Cambridge School of Agriculture. It will be studied with interest by teachers of agricultural chemistry in other colleges, who have not as yet any very extensive text-book literature at their disposal. Further, many of them will be anxious to learn as much as possible of the secret of Prof. Wood's success, and to see the details of the course he has evolved since he has been responsible for the teaching of agricultural chemistry at Cambridge.

The exercises set are mainly analytical. Right from the outset the student has to use the accepted method, working it out in all its details; there are no short class-room methods such as would have to be discarded later. Much time is thus saved, for the student has nothing to unlearn when he leaves college and has to attack actual problems in a technical laboratory. The system is only possible, of course, when the student has already had a certain amount of experience of chemical work before turning to agricultural chemistry, but this ought always to be the case.

Where methods are so conventional as they necessarily are in agricultural chemistry, there is little room for originality, but Prof. Wood is not entirely hampered by custom, and has not hesitated to give newer methods where any advantage is to be gained. Thus he uses Neubauer's method for determining the potash and phosphoric acid in soils, which for some reason or other is not commonly used in England in spite of its accuracy and rapidity. He also describes the volumetric method of determining phosphoric acid, in addition to the ordinary gravimetric method. Other exercises include short studies of clay, sand, and humus, the retention of manures by soil, and experiments on oils and proteins. Sufficient detail is everywhere given to enable the student to work on his own account, but there is nothing superfluous, and the whole forty sections go into fifty pages. Altogether the book can be cordially recommended for advanced students, and also for the growing class of men who have to carry out agricultural examinations and analyses but do not want to purchase the large costly manuals. Most of the routine work of an agricultural laboratory is described.

E. J. R.

Physical Geography for Schools. By B. Smith. Pp. viii+190. (London: A. and C. Black, 1911.) Price 3s. 6d.

"We have," wrote W. D. Cooley in 1875, "numerous treatises on physical geography which are in reality merely outlines of geology," and he attributed them to the influence of the ardent geologists of half a century earlier who had ennobled the rudiments of geography connected with their own pursuits with the title of physical geography.

Mr. Bernard Smith's text-book shows that there is still ground for Mr. Cooley's complaint, for it treats physical geography as mainly geology. It describes the physical process at work on the earth's surface, and deals inadequately with the distribution of the results and their influence on human development. The book is admirably illustrated, but a large proportion of its 221 figures are geological, and many of the best are from the collection of the Geological Survey. The photograph of the deck of a warship (p. 180) might have been replaced by one of more geographical value.

The book makes no claim to originality either in subject or method. It begins with short accounts of the solar system and the atmosphere; most of the book is devoted to a description of the composition, sculpture, and forms of the land, and it ends with a brief summary of the geological history of the British Isles. The author occasionally assumes too much knowledge of other sciences, and gives some explanations, as of the electro-magnetic theory of light, which are unnecessary in a geographical text-book.

On its lines the book is well done, but the paragraph on p. 12, "The atmosphere is heated chiefly in two ways—by the internal heat of the earth and by the sun's rays," would suggest that the internal heat has a powerful effect. The term caldera is used for a large crater, whereas it is better limited to a crater formed by subsidence. There are inevitably a few mistakes, such as the statement that the Colchester earthquake destroyed from twelve to thirteen thousand buildings; the title of a view of Stirling calls the river there the Tay, and the Midland Valley of Scotland is described as a lowland plain.

Die Elemente des Herzmuskels. By Prof. A. Dietrich.

Pp. 46. (Jena: Gustav Fischer, 1910.) Price 1.20 marks.

THE twelfth of the series of short monographs published under the editorship of Profs. Gaup and Nagel is a very able and interesting account of the minute structure of cardiac muscle, by Prof. Dietrich, of Charlottenburg. Perhaps of most value at the moment is his concise and judicious statement of our knowledge of the structure and distribution of the atrio-ventricular bundle, that complex system of peculiar fibres collecting the whole musculature of the heart under its extended grasp, as if for purposes of co-ordination. More original and of great interest is his discussion as to the meaning of the transverse lines which are still very generally accepted as limits to those individual cells by the juxtaposition of which the fibres of cardiac muscle are said to be formed. Faith in this view was somewhat shaken when it was found the structural element of major importance, the intra-cellular contractile fibrils, swept through these lines without interruption. More recently this view has been still further discredited by proof of their irregularity of occurrence in relation to the nuclei of the tissue.

Prof. Dietrich does not attempt to arrive at any very definite conclusion in this matter, but his treatment of the subject includes an excellent and impartial summary of views advanced by other recent investigators, and is illuminated by the results of his own experience and observations. It seems clear that these lines are definite incidents of structure of invariable occurrence and not artefacts due to conditions prevailing only at death or in the technique of the histologist. That is to say, Prof. Dietrich makes this clear, and his observations of their differential distribution in various districts of the wall of the heart, and discussion as to the circumstances more characteristically prevalent in each of these districts deserve special attention.

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Black's Medical Dictionary. Edited by John D. Comrie. Pp. x+855. Fourth edition. (London: A. and C. Black, 1910.) Price 7s. 6d. net.

THIS book, which has now reached its fourth edition, contains an extraordinary amount of information in a comparatively small space. So far as we have been able to test it the details given seem generally to be accurate, and we consider that it well fulfils its avowed function of imparting medical knowledge in comparatively non-technical language, such as is required by the district nurse, health visitor, clergyman and missionary, ship's captain, colonist, traveller, and others. We think that some of the rare conditions mentioned, such as acromegaly, myasthenia, and syringomyelia, might well have been omitted, and the space gained have been devoted to such a subject as the management of labour, which is too briefly treated. Similarly, the pages devoted to the history of anaesthetics are of no real value, and had they been cut down to one-half, and a few practical hints given on the administration of anaesthetics (which occasionally has to be done by a missionary, ship's captain, &c.), the book would have gained in usefulness.

What will the Weather be? The Amateur Forecaster's Vade Mecum. By H. G. Busk. Pp. 36. (Cambridge: W. Heffer and Sons, Ltd., 1911.) Price 6d. net.

IT is less than a year ago that the first edition of this useful booklet appeared. We notice that in the new edition tables for confirming a forecast, and a note on the significance of a barogram, have been added.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

The Early History of the Gibraltar Cranium.

THE Gibraltar cranium is generally regarded by anthropologists as one of the most important discoveries yet made of the Neanderthal type of man. Unfortunately, its early history is imperfectly known. The two following letters help to make good this deficiency. For the first I am indebted to Colonel E. R. Kenyon, Commandant of the Royal Engineers at Gibraltar; for the second, to the Misses Busk, daughters of Mr. George Busk, F.R.S., who in 1868 presented the cranium to the Royal College of Surgeons, England, of which he was at one time president.

Engineer House,
Gibraltar,

April 2, 1910.

"In the Minutes of the Gibraltar Scientific Society, under date March 3, 1848, there is this record":—

Presented a Human Skull from Forbes Quarry, North Front, by the Secretary.

"On February 4, 1846, Lieut. Flint, R.A., was elected secretary, and there is no record of any change. The officers of the society were re-elected in February, 1847, and February, 1848.

"The last recorded meeting of the society was in May, 1853.

"The old plans have been examined, and no place named 'Forbes Quarry' can be found, but I think there can be no doubt that it is the disused limestone quarry shown on the Ordnance Survey south-east of the ancient 'Forbes Barrier.' The obsolete batteries near there are the 'Forbes Batteries,' and these are the only sites to which the name 'Forbes' is attached."

E. R. KENYON.

"Col., Chief Engineer."

"P.S.—Lieut. Flint died at Mauritius as a captain on January 12, 1857."